DEVELOPMENT OF A GEOGRAPHIC INFORMATION SYSTEM AS A MANAGEMENT TOOL TO REDUCE BYCATCH OF SEA TURTLES IN UNITED STATES ATLANTIC OCEAN AND GULF OF MEXICO FISHERIES

OBJECTIVES

The National Ocean Service (NOS) National Centers for National Ocean Science (NCCOS) Biogeography Team is partnering with the National Marine Fisheries Service (NMFS) to develop a geographic information system (GIS) as a management tool to reduce bycatch of sea turtles in United States (U.S.) Atlantic Ocean and Gulf of Mexico Fisheries. The Biogeography Team is responsible for meeting the following objectives:

1. Development of a comprehensive GIS in cooperation with NMFS that incorporates:
   a. Sea turtle distribution
   b. Commercial fishing activity
   c. Observed takes (bycatch) of sea turtles
   d. Federal and state regulations relevant to sea turtles
   e. Oceanographic conditions relevant to sea turtle distribution
2. Support NMFS with data quality assurance and quality control of sea turtle, fisheries, oceanographic, and regulatory data
3. Support NMFS with processing and development of GIS data layers to be used to create visual products, tools, and analyses needed to implement the Strategy
4. Provide NMFS with consultative support to expand GIS capabilities to meet broader agency needs
5. Train NMFS' Strategy team members to effectively manipulate data layers and mapping capabilities created for the GIS in ArcMap

PROJECT BACKGROUND

All species of sea turtles inhabiting the Atlantic Ocean and Gulf of Mexico are listed as either endangered or threatened under the ESA. Five species of sea turtles are commonly found in U.S. Atlantic and Gulf of Mexico waters. None of the species have yet met the recovery goals outlined in their respective recovery plans. Within this region, the leatherback, loggerhead, and Kemp's Ridley are the most widely distributed, while the green turtle and hawksbill are found more commonly south of Virginia. Trends in populations are difficult to determine but among the five species, only the Kemp's ridley has shown a long-term, strongly increasing trend in the number of nesting females (the most common measure of population status). Loggerheads nest predominately from North Carolina through the panhandle of Florida and these beaches comprise the second largest nesting assemblage in the world. Along the mainland U.S., the leatherback and green turtle nest almost

exclusively in Florida. U.S. inshore and offshore waters from Maine through Texas provide critically important habitat for feeding, migration, courtship, and mating. Incidental capture in fisheries is a major limiting factor in the recovery of sea turtles in these areas.

NMFS is responsible for protecting sea turtles in the marine environment and has implemented conservation and monitoring programs, regulations, and other actions under the ESA to recover these species. To further help meet ESA recovery goals for sea turtles, NMFS is implementing the strategy for sea turtle conservation and recovery in relation to Atlantic Ocean and Gulf of Mexico fisheries ("Strategy"). The Strategy, finalized in a decision memorandum in June 2001, is a strategic plan to address the incidental capture of sea turtles in federal and state fisheries through a comprehensive, integrated, and consistent gear-based approach. The Strategy is a new approach to reducing incidental capture of sea turtles in U.S. commercial and recreational fisheries that will rely heavily upon involvement of stakeholders (e.g., fishing industry, non-government organizations, and the interested public). This strategy evolved out of the need to address sea turtle bycatch reduction in fisheries of the Atlantic and Gulf of Mexico in a more comprehensive way. A strategic approach evaluating fishery impacts by gear types across state, federal, and regional boundaries will increase management effectiveness. Rather than addressing turtle bycatch issues fishery by fishery, or state by state, the Strategy will focus on fishing gear types known to take sea turtles across their range in the Atlantic and Gulf of Mexico. Ultimately this approach should be both effective and inclusive for the challenge of recovering threatened and endangered sea turtles in the Atlantic and Gulf with U.S. fishery constituents. The major priorities of the Strategy include: a) continue and improve stock assessments for each stock/species of sea turtle found within the U.S. Exclusive Economic Zone (EEZ), b) improve and refine estimation techniques for the takes of sea turtles to ensure that the criteria for recovery are being met are consistent with ESA mandates, c) continue and improve the estimation or categorization of sea turtle bycatch by gear type and fishery, d) evaluate the significance of bycatch by gear type, e) convene specialist groups to prepare plans for reduction of takes for gear types with significant levels of sea turtles take, and f) promulgate ESA and Magnuson-Stevens Act (MSA) regulations implementing plans developed for se turtle take reduction by gear type. Sea turtle conservation measures will be developed using all elements of the Strategy - information gathering, research and analysis, and stakeholder involvement.

The professional development of a dynamic GIS for sea turtles to facilitate the implementation of the Strategy is a key baseline need. The development of such a GIS would also assist NMFS in meeting other ESA and legislative responsibilities that require everything from simple maps to in-depth geographic/oceanographic analyses. While there are several efforts that have been undertaken to compile sea turtle datasets into a GIS environment there has been no comprehensive NMFS sea turtle program-wide approach. The development of a fully integrated GIS for turtles would be cross-regional and would serve the national program. NCCOS' Biogeography Team has been identified as the most appropriate group within NOAA to develop these capacities for NMFS. The Biogeography Team has extensive GIS and database experience to ensure that the

products developed will meet the needs of the Strategy and NMFS. Partnering with NCCOS' Biogeography Team will facilitate working with both regions and centers as well as coordinating with NMFS' Office of Protected Resources-based team leader for the Strategy.

CONTACT INFORMATION

Connie Y. Moy
1305 East-West Highway
SSMC-IV, 9th Floor
Silver Spring, MD 20910
301-713-3028 ext. 227
Connie.Moy@noaa.gov

John D. Christensen
1305 East-West Highway
SSMC-IV, 9th Floor
Silver Spring, MD 20910
301-713-3028 ext. 153
John.Christensen@noaa.gov